

# Assessment 2

## Question 1- Ansible installation and linking nodes to master

### Step 1. Creating a EC2 machine:

- a) Writing the instance name, selecting AMI and number of instances to launch (here we are launching 2 one will be master and other as node)

The screenshot shows the AWS Management Console interface for launching an EC2 instance. The breadcrumb navigation at the top indicates the path: EC2 > Instances > Launch an instance. The main heading is 'Launch an instance' with an 'Info' link. Below this, a sub-header 'Name and tags' has a text input field containing 'Ansible-master' and a link to 'Add additional tags'. The 'Application and OS Images (Amazon Machine Image)' section includes a search bar and a 'Quick Start' tab. Under 'Quick Start', several AMI options are displayed: Amazon Linux, macOS, Ubuntu (selected), Windows, Red Hat, SUSE Linux, and Debian. To the right, the 'Summary' panel provides a overview of the configuration: 'Number of instances' is set to 2, 'Software Image (AMI)' is Canonical, Ubuntu, 24.04, amd64, 'Virtual server type (instance type)' is t3.micro, 'Firewall (security group)' is launch-wizard-3, and 'Storage (volumes)' is 1 volume(s) - 8 GiB. At the bottom of the summary panel, there is a 'Free tier' banner and buttons for 'Cancel', 'Launch instance', and 'Preview code'.

- b) Selecting instance run type as t3 micro and key pair for it

t3.micro

Free tier eligible

Family: t3 2 vCPU 1 GiB Memory Current generation: true

On-Demand Ubuntu Pro base pricing: 0.0139 USD per Hour

On-Demand SUSE base pricing: 0.0104 USD per Hour On-Demand Linux base pricing: 0.0104 USD per Hour

On-Demand RHEL base pricing: 0.0392 USD per Hour On-Demand Windows base pricing: 0.0196 USD per Hour

All generations

Compare instance types

Additional costs apply for AMIs with pre-installed software

▼ Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

Ansible

Create new key pair

▼ Network settings Info

Edit

Network Info

vpc-0047b25160c3ca412

Subnet Info

No preference (Default subnet in any availability zone)

Auto-assign public IP Info

Enable

Additional charges apply when outside of free tier allowance

c) Selecting Security group ( I have used pre created SG that has ssh, http and https access)

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group

Select existing security group

Common security groups Info

Select security groups

launch-wizard-3 sg-00a44697dbccdbe40 X

VPC: vpc-0047b25160c3ca412

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

▼ Configure storage Info

Advanced

1x 8 GiB gp3 Root volume, 3000 IOPS, Not encrypted

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

Add new volume

The selected AMI contains instance store volumes, however the instance does not allow any instance store volumes. None of the instance store volumes from the AMI will be accessible from the instance

Click refresh to view backup information

The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.

## Step 2: Installing Ansible and setting up both node and master

## a) Master - Running updates and ansible installation in root

```
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-34-156:~$ sudo su
root@ip-172-31-34-156:/home/ubuntu# apt update -y
apt-get install -y software-properties-common
apt-add-repository ppa:ansible/ansible
apt-get update
apt-get install -y ansible
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

## b) Node - Entering root and doing updates in node as well

```
Usage of /: 25.4% of 6.71GB Processes: 114
Memory usage: 24% Users logged in: 0
Swap usage: 0% IPv4 address for ens5: 172.31.39.232

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-39-232:~$ sudo su
root@ip-172-31-39-232:/home/ubuntu# apt update -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
```

**i-03f464371ff4c5926 (Ansible-node)**

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## c) Master - Checking ansible version in master and making changes in host file

```
root@ip-172-31-34-156:/home/ubuntu# ansible --version
ansible [core 2.18.8]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.12.3 (main, Feb  4 2025, 14:48:35) [GCC 13.3.0] (/usr/bin/python3)
  jinja version = 3.1.2
  libyaml = True
root@ip-172-31-34-156:/home/ubuntu# vi /etc/ansible/hosts
```

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#### d) Master - Adding private ip of node in master

```
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers:
[ansiblegroup]
172.31.39.232
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
#
# Ex 2: A collection of hosts belonging to the 'webserver' group:
## [webserver]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
#
# If you have multiple hosts following a pattern, you can specify
# them like this:
-- INSERT --
```

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#### e) Master - Adding another user Devops

```
root@ip-172-31-34-156:/home/ubuntu# adduser devops
```

```

New password:
Retype new password:
passwd: password updated successfully
Changing the user information for devops
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] y
info: Adding new user `devops' to supplemental / extra groups `users' ...
info: Adding user `devops' to group `users' ...
root@ip-172-31-34-156:/home/ubuntu#

```

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f) Node – Adding another user Devops with same credentials as in master

```

root@ip-172-31-39-232:/home/ubuntu# adduser devops
info: Adding user `devops' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `devops' (1001) ...
info: Adding new user `devops' (1001) with group `devops (1001)' ...
info: Creating home directory `/home/devops' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for devops
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n]
info: Adding new user `devops' to supplemental / extra groups `users' ...
info: Adding user `devops' to group `users' ...
root@ip-172-31-39-232:/home/ubuntu#
root@ip-172-31-39-232:/home/ubuntu#
root@ip-172-31-39-232:/home/ubuntu#

```

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g) Master – making changes in sshd\_config file

```

root@ip-172-31-34-156:/home/ubuntu# vi /etc/ssh/sshd_config

```

```

#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes
#PermitEmptyPasswords no
-- INSERT --

```

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## h) Master– making changes in 60-cloudimg-settings.conf file

```
root@ip-172-31-34-156:/home/ubuntu# vi /etc/ssh/sshd_config.d/60-cloudimg-settings.conf
```

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i) Node – making changes in sshd\_config file

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```

#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes
#PermitEmptyPasswords no

-- INSERT --

```

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PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232

j)Node – making changes in 60-cloudimg-settings.conf file

```

root@ip-172-31-39-232:/home/ubuntu# vi /etc/ssh/sshd_config.d/60-cloudimg-settings.conf
root@ip-172-31-39-232:/home/ubuntu#

```

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k) Restarting both node and master

```
root@ip-172-31-39-232:/home/ubuntu# service ssh restart
```

### Step 3. Giving sudo all permissions in master

a) Master opening visudo

```
root@ip-172-31-34-156:/home/ubuntu# visudo
root@ip-172-31-34-156:/home/ubuntu#
```

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```
GNU nano 7.2
# "sudo scp" or "sudo rsync" should be able to use your SSH agent.
#Defaults:%sudo env_keep += "SSH_AGENT_PID SSH_AUTH_SOCK"

# Ditto for GPG agent
#Defaults:%sudo env_keep += "GPG_AGENT_INFO"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
devops  ALL=(ALL:ALL) NOPASSWD :ALL
# Members of the admin group may gain root privileges
%admin  ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "@include" directives:

@includedir /etc/sudoers.d

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execut
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justif
```

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### Step 4. Entering in devops and generating key

#### a) Master - Generating key

```

root@ip-172-31-34-156:/home/ubuntu# su - devops
devops@ip-172-31-34-156:~$ sudo-keypair
sudo-keypair: command not found
devops@ip-172-31-34-156:~$ ssh-keygen
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/devops/.ssh/id_ed25519):
Created directory '/home/devops/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/devops/.ssh/id_ed25519
Your public key has been saved in /home/devops/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:1BG3Bq8JotOiXXB6VnLp72qJ0XJUjfErloT5zTernvY devops@ip-172-31-34-156
The key's randomart image is:
+--[ED25519 256]--+
|      ==.      |
|      +oB..    |
|    . + B.+ =   |
|    * *. = B .  |
|  = =o. S + o   |
| o *o oo . . o  |
|. . = . . .    |
|    . o. .o     |
|    ....o+.E    |
+-----[SHA256]-----+
devops@ip-172-31-34-156:~$

```

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b) Master – copying keypair and establishing connection between nodes and master

```

devops@ip-172-31-34-156:~$ ls
devops@ip-172-31-34-156:~$ ls -a
.  ..  .bash_logout  .bashrc  .profile  .ssh
devops@ip-172-31-34-156:~$ d .ssh
d: command not found
devops@ip-172-31-34-156:~$ cd .ssh
devops@ip-172-31-34-156:~/ssh$ ssh-copy-id devops@172.31.39.232

```

#### i-0d40b6e056e27dac2 (Ansible-master)

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## Step 5. Generating files in all nodes through master and cross checking it

a) Master – creating files

```

devops@ip-172-31-34-156:~/ssh$ ansible all -a"touch file1.sh"
[WARNING]: Platform linux on host 172.31.39.232 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.18/reference_appendices/interpreter_discovery.html for more
information.
172.31.39.232 | CHANGED | rc=0 >>
devops@ip-172-31-34-156:~/ssh$

```

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PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

b) Master - checking files in master

```
devops@ip-172-31-34-156:~/.ssh$ ansible all -a"ls"
[WARNING]: Platform linux on host 172.31.39.232 is using the default python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible/latest/reference_appendices/config.html#ansible-python-interpreters
172.31.39.232 | CHANGED | rc=0 >>
file1.sh
file2.sh
devops@ip-172-31-34-156:~/.ssh$
```

### **i-0d40b6e056e27dac2 (Ansible-master)**

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c) Node – checking the created file in node

```
root@ip-172-31-39-232:/home/ubuntu# cd ..
root@ip-172-31-39-232:/home# ls
devops  ubuntu
root@ip-172-31-39-232:/home# cd devops
root@ip-172-31-39-232:/home/devops# ls
file1.sh  file2.sh
root@ip-172-31-39-232:/home/devops#
```

### **i-03f464371ff4c5926 (Ansible-node)**

PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232

## **Question 2 - Practice writing ansible playbook**

a) Creating the yaml file / Playbook to install Docker and copy a file

```
devops@ip-172-31-38-71:~$ vi myfirstplaybook.yml
```

```
---
- hosts: all
  become: true
  tasks:
    - name: Install Docker
      ansible.builtin.package:
        name: docker.io
        state: present
    - name: Copy file with owner Permission
      ansible.builtin.copy:
        src: /home/devops/myfirst.txt
        dest: /home/devops
```

### Question 3 - Write ansible playbook to install tomcat 9 in node

- a) Write a YAML file to install apache